The SEAMLESS-IF software platform

System for Environmental and Agricultural Modelling;
Linking European Science and Society - Integrated Framework

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cirad
LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

seamless

Context

EC and the estimation of the impact of political decisions on agriculture

CAPRI model → Estimation at regional scale €

XXI^{ème} s., new rules to consider

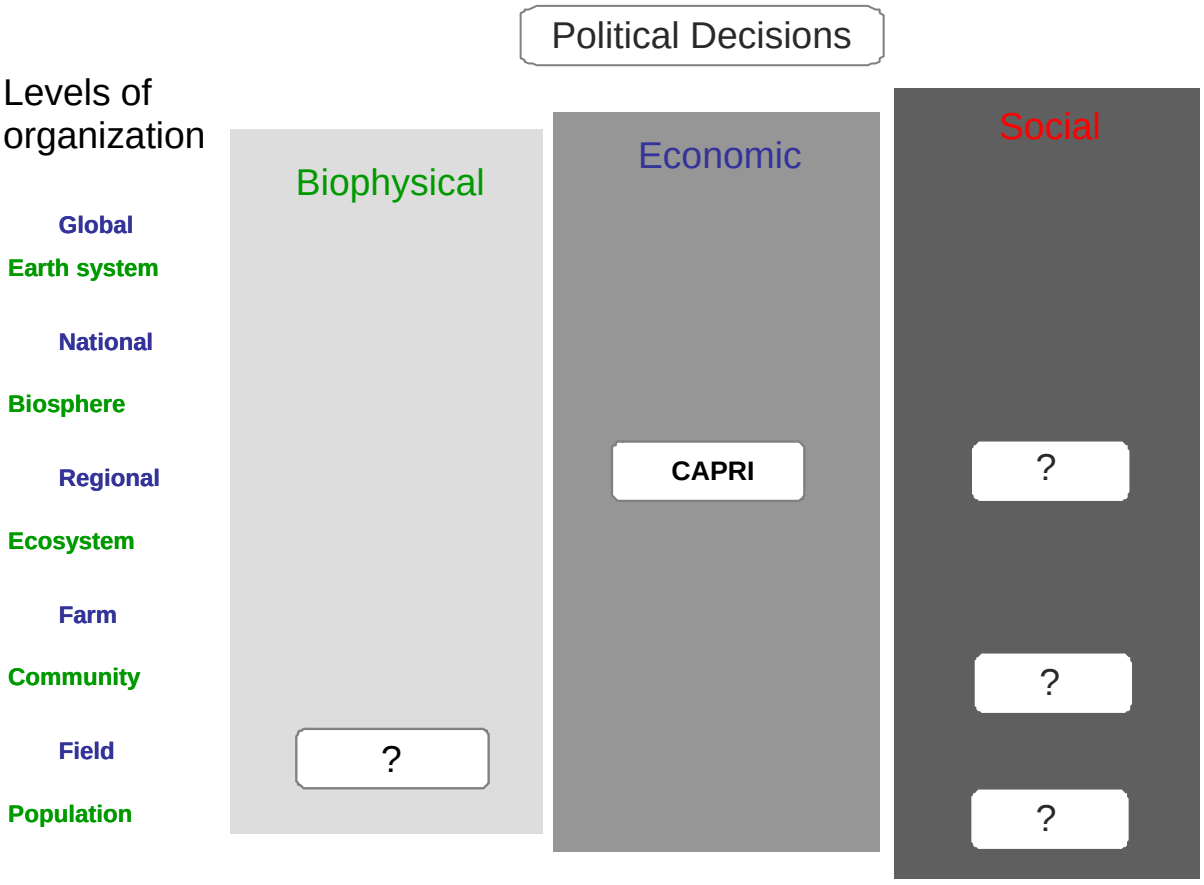
Ecology (reduce pesticides,...)

⇒ SEAMLESS European Project
Estimations for 50 years
Duration of the project 4 years

Country Borders Opening
(exchange, migration, …)

How to proceed ?

Levels of organization considered and modelling options



Modelling options :

- Improve CAPRI
- Build a new simulation model
- …

Material and Method

Adopted solution : reuse of Sim. Mod. available in Europe, as much as possible…

To be partner of the project, a scientific team :

- Has a running simulation model available
  ⇒ Adaptation of the Simulation Model…
- Is involved in one of the required fields of research (scientific recognition … Network)
  ⇒ Elaboration of the simulation model

Steps of the software platform construction :

Year 1&2 :
- Scientific : revisit / construction of the simulation models
- Computer science : (i) Elaboration of the computer system and (ii) Association of existing model independently of their scientific status / final objective

⇒ End of year 2 : Running Prototype (No scientific value)

Year 3
- Integration of the simulation models in SEAMLESS-IF and tests

Year 4
- Evaluation of SEAMLESS-IF on agronomic test zones

⇒ End of year 4 : Final Release

Results : Year 0

Selection of the simulation models

Levels of organization

Global

Earth system

National

Biosphere

Regional

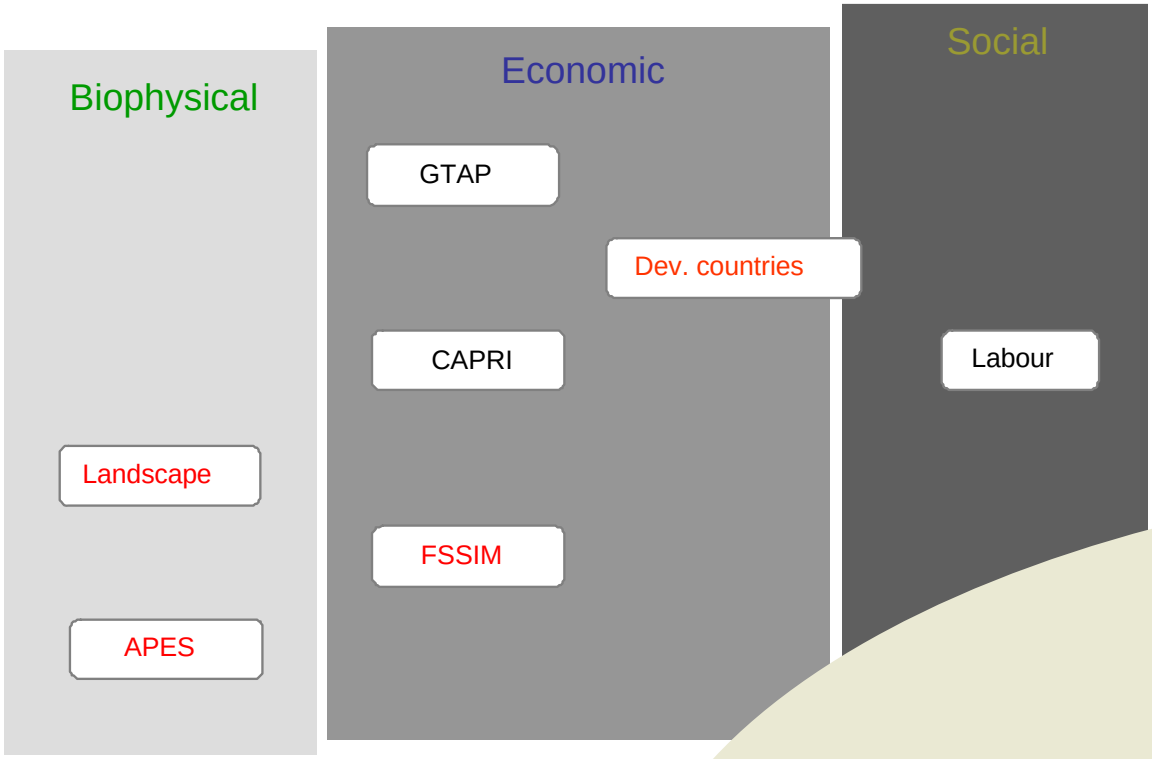
Ecosystem

Farm

Community

Field

Population



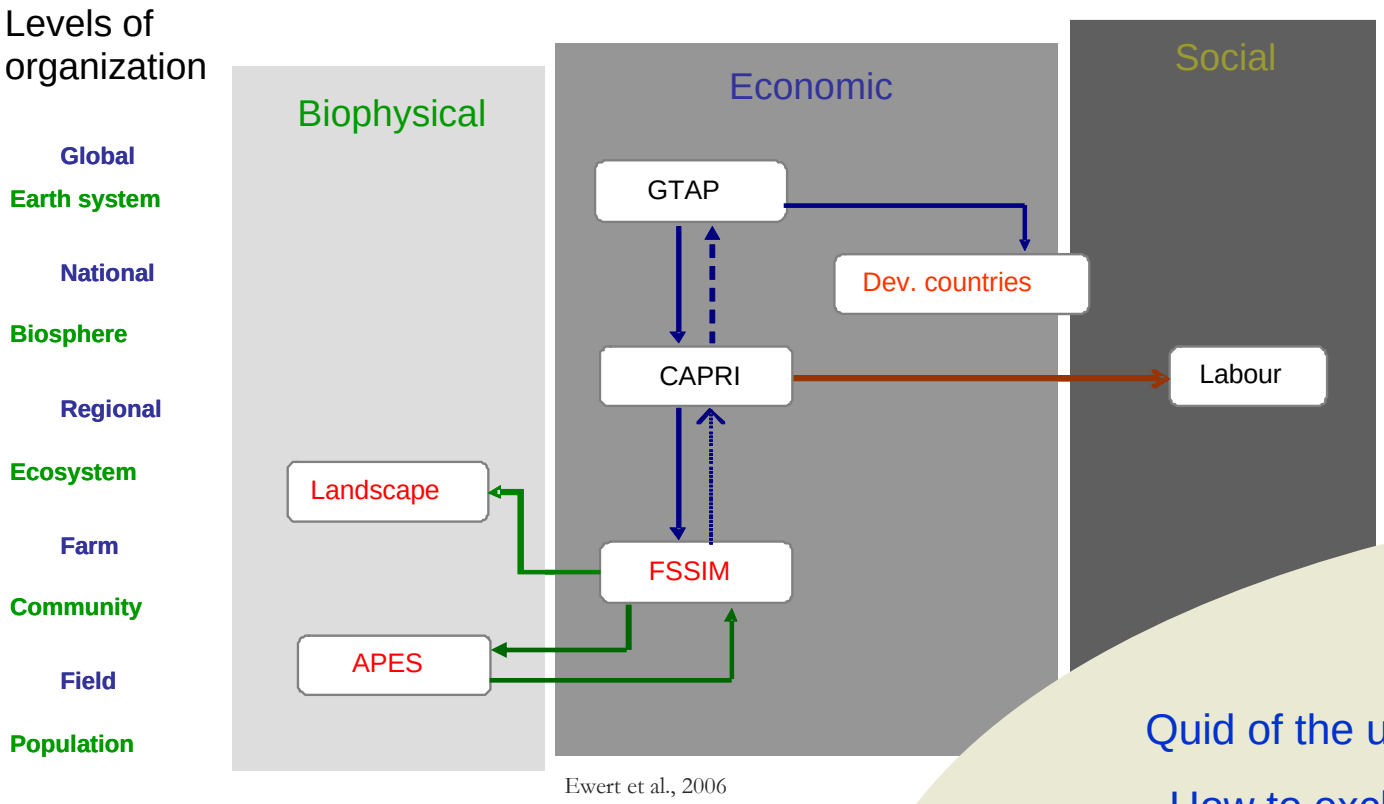
Ewert et al., 2006

XXX :

Can be build using the existing knowledge…

Results : Year 0

Composition of the simulation models



Ewert et al., 2006

xxx : Can be build using the existing knowledge…

Quid of the up and down scaling ?

How to exchange data between the simulation models ?

Results : Year 0

Solution for up and down scaling

Levels of organization

Global
Earth system
National
Biosphere
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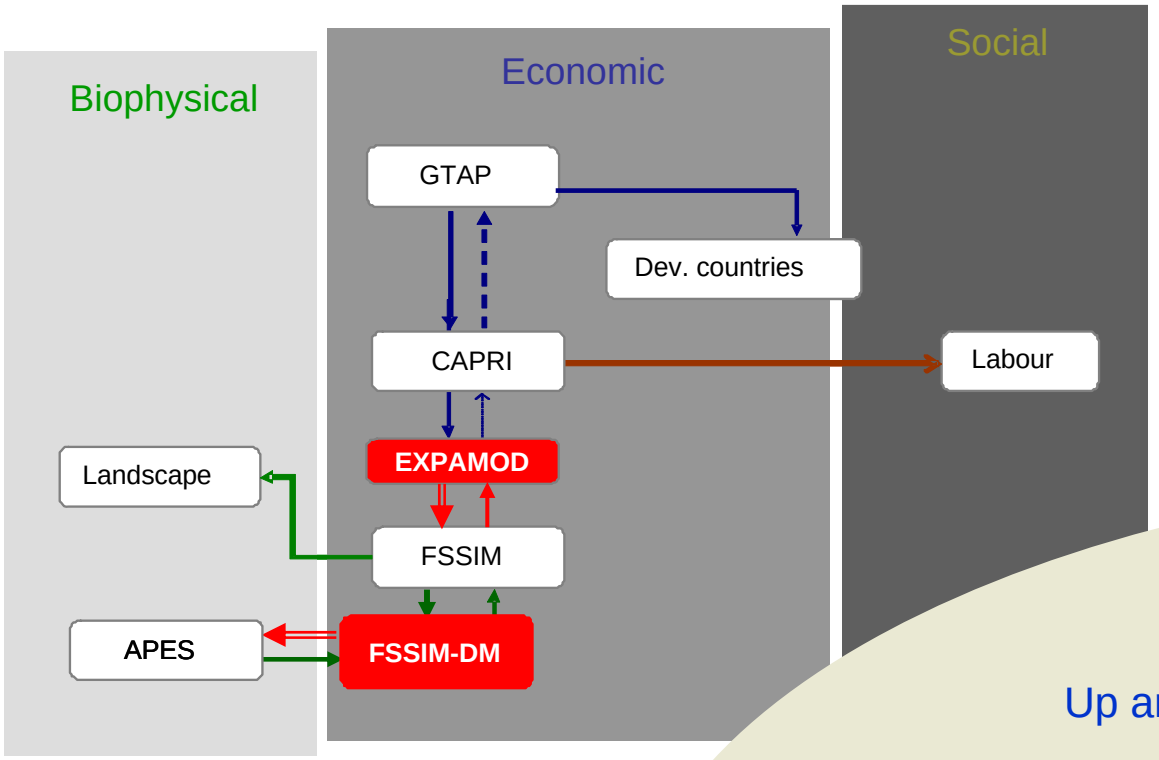
Ecosystem
Farm
Community
Field
Population



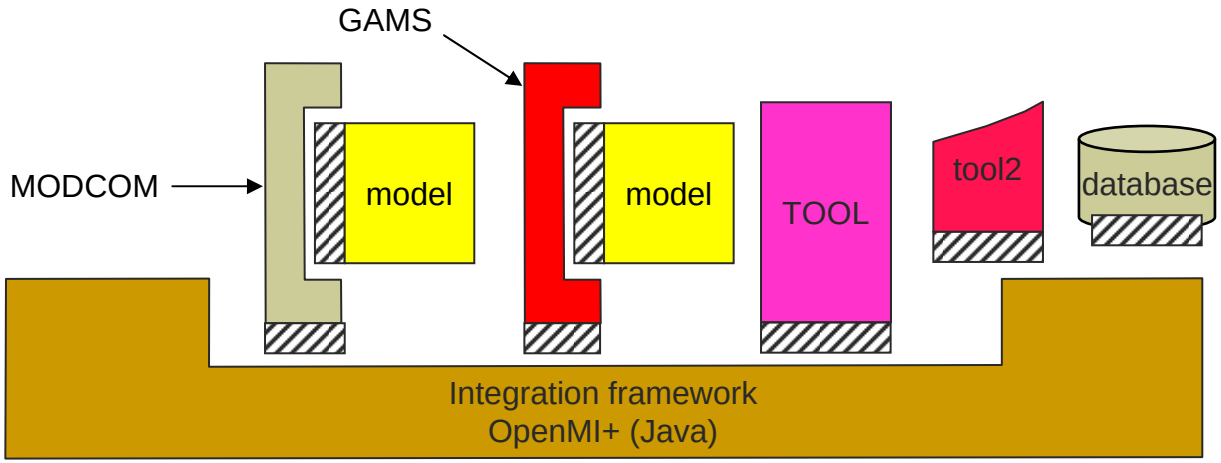
Up and down scaling :

- Elaboration of specific models
- Loops

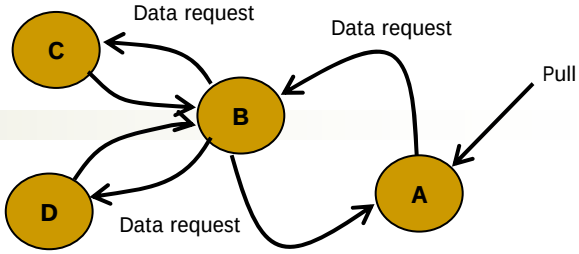
Results

Support media for simulation model coupling and data exchange

Reuse of OpenMI media developed by the LIFE European program.

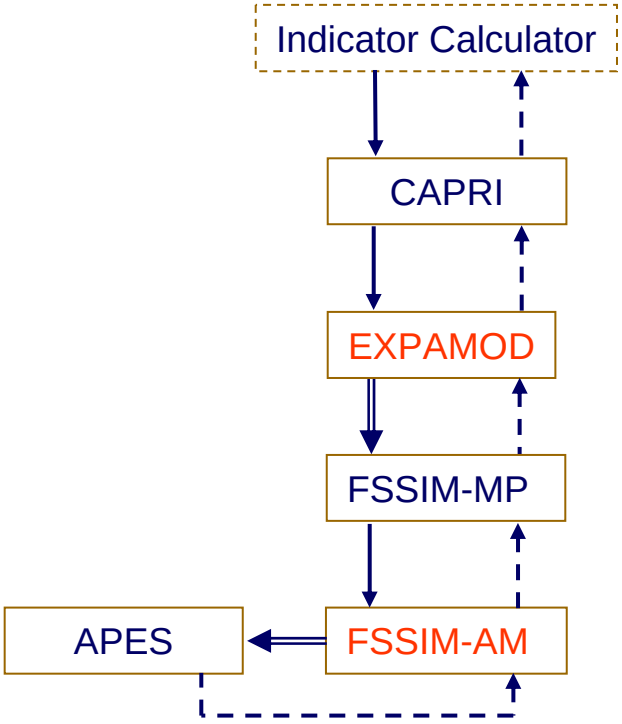


Pull based system



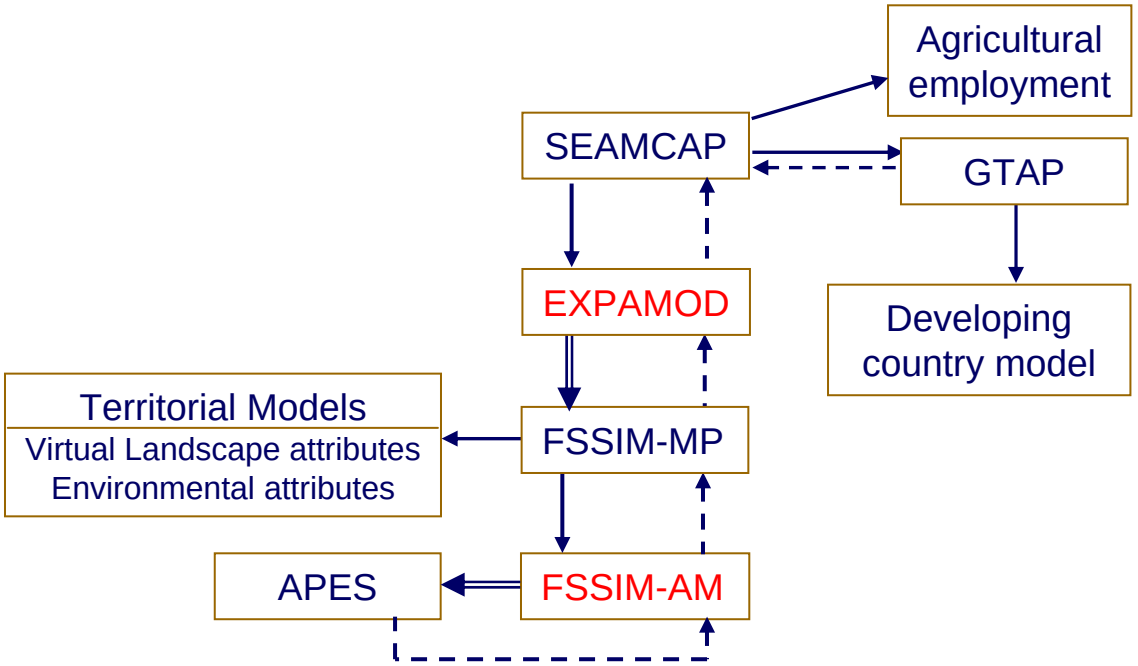
Results

Running prototype (end of year 2)



(Ittersum et al., 2006)

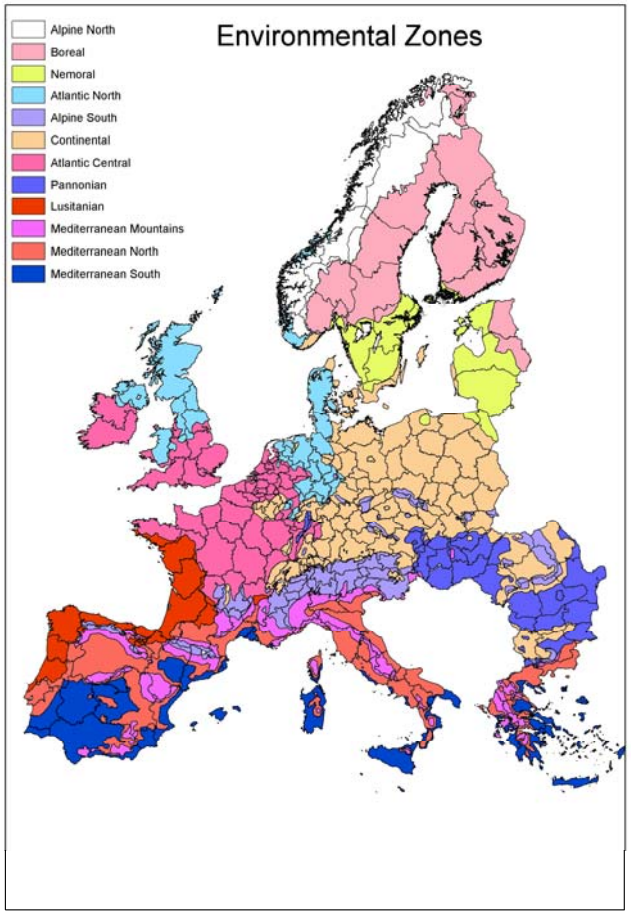
Final release (end of year 4)



(Ittersum et al., 2008)

Simulations

Input and test zones : data from GTAP



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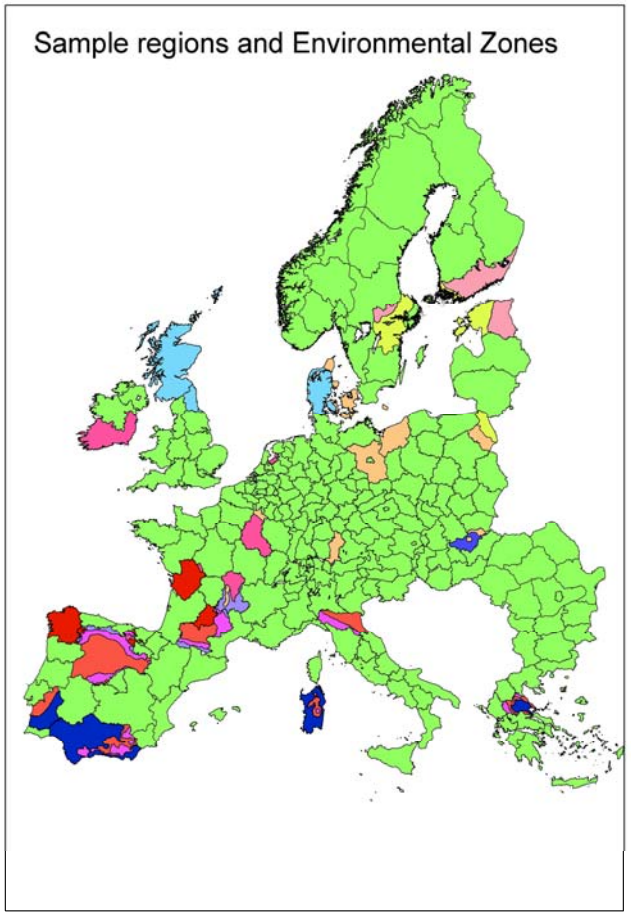
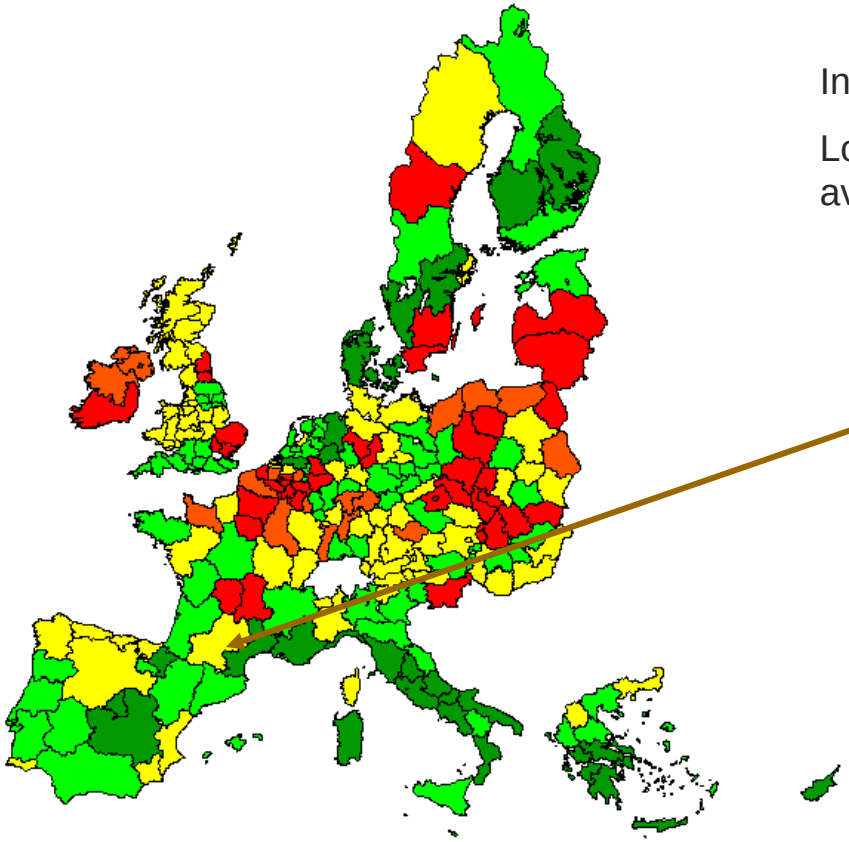


(Ittersum et al., 2009)

Simulations

Example : change in agricultural income



(Ittersum et al., 2009)

Income declines in all regions

Losses vary between -2.5 and -16%, with an average decline of -6%

	Price change (%)
Meat	-5.0
Cereals	-3.8
Vegetables & perennials	-2.9
Dairy products	-2.0
Oilseeds	-1.7
Arable crops	-1.6
Oils	-0.9
Animal products	0.7

Conclusion

SEAMLESS-IF in one word = RE-USE ⇒ simulation programs, coupling support media, Data, …

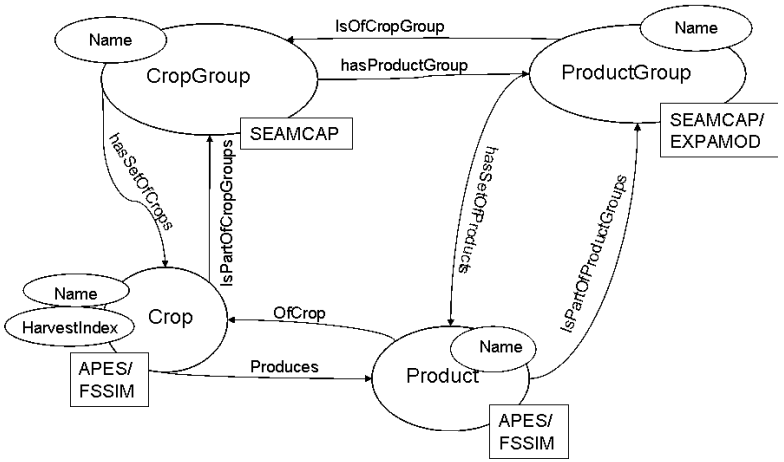
SEAMLESS-IF available @ http://www.seamlessassociation.org/

Interest of such project:

Create collaboration (network ?) between research teams in regards to a common objective

Difficulties and Benefits:

Elaborate a common vocabulary of several research domains and disciplines…



(Janssen et al., 2009)

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Thanks for your attention.